

BULLETIN

"An organization of people interested in the Natural Sciences"



April 2026; Vol. 80, #3

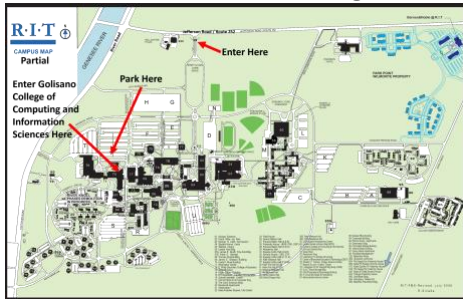
President's Message

The Rochester Academy of Science Annual Meeting & Spring Lecture is Monday, April 20, 7:00 p.m.

Please join your Academy colleagues for the RAS Annual Meeting and the Spring Lecture on April 20th at the Rochester Institute of Technology's (R.I.T.) Golisano College of Computing and Information Sciences (Building 70) Auditorium, Room 1400. It will also be available on Zoom. Our meeting will include the election of board members. Details on the meeting, a full-sized map, and Zoom link is on <https://rasny.org/ras-annual-meeting>. The ballot and voting instructions are on page 7.

* * *

Directions to Annual Meeting at R.I.T.



R.I.T. is southwest of Rochester at One Lomb Memorial Drive, Rochester, NY 14623-5603, off Jefferson Road. Parking is in Lot J. Golisano College of Computing and Information Sciences is due south of the parking lot. The auditorium, Room 1400, is on the first floor.

* * *

Guest Speaker

Following the short business meeting, our annual Spring Lecture speaker is Dr. Warren Allmon, Paleontological Research Institution (PRI) Director, on

"Natural History Museums and the Future of the World."



Dr. Allmon addresses the role of natural history museums in tackling global challenges like climate change and biodiversity loss. He argues that museums must move beyond being passive "cabinets of curiosity" to become active educational leaders. For example, PRI's "Museum of the Earth" opened the [Changing Climate: Our Future, Our Choice](#) exhibit, emphasizing how the Earth's climate has changed many times in the past, is changing at an unprecedented rapid rate due to the actions of humans, and how we have the power to take action and make positive changes based on lessons from the Earth's past. See the March *RAS Bulletin* for more details.

The lecture is free to the public. I hope you will come! Invite your friends.

* * *

Annual Meeting Agenda.

- Welcome & President's Comments.
- Election & Vote on By-Laws
- Induction of new Fellows
- Financial Report
- Proposed 2027 By-Laws changes
- Spring Lecture
- Election Results
- Refreshments after meeting close

Michael Grenier, RAS President

Notice

All-Academy Annual Business Meeting
7:00 p.m., Monday, April 20
R.I.T. Golisano College of Computing and Information Sciences (Building 70) Auditorium, Room 1400 & on Zoom, instructions at <https://rasny.org/ras-annual-meeting>



Rochester Academy of Science

Free Spring Public Lecture

by Dr. Warren Allmon



Director of the Paleontological Research Institution Cornell University Adjunct Associate Professor

Natural History Museums and the Future of the World



The Museum of the Earth at the Paleontological Research Institution opened to the public in September 2003. The building received an Excellence in Design Award from the New York State Chapter of the American Institute of Architects in 2004.

7:30 p.m. □ Monday, April 20, 2026

RIT Golisano College of Computing and Information Sciences (Building 70) Auditorium, Room 1400.

www.rasny.org for directions

Meeting of Members at 7:00 p.m.

Events for April 2026

Apr 1 Wed: Astronomy Board Meeting

7:00 p.m. – 9:00 p.m. Zoom only. Members welcome to attend. Contact Craig Kaplan at President@rochesterastronomy.org for details.

Apr 3 Fri: Astronomy Members Meeting

7:00 p.m. – 9:00 p.m. RIT, Carlson Building, Room 1125. The speaker will be Dr. ZJ Zhang. Contact Craig Kaplan at President@rochesterastronomy.org for details.

Apr 7 Tues: Fossil Members Meeting

7:00 p.m. – 9:00 p.m. Pittsford Community Center, room 018, 35 Lincoln Avenue Pittsford, NY 14534. Open to all RAS members and guests. It will also be broadcast on Zoom. Speaker: Dr. Jennifer Olori on *Frustrating frogs: impact of bias and variation on identification of Pleistocene anurans from Cathedral Cave, NV*. For meeting details and Zoom login info, see the *FossilLetter* or contact Michael Grenier at paleo@frontier.com or (585) 671-8738.

Apr 8 Wed: Herbarium

12:00 p.m. - 3:00 p.m. The Life Sciences section will hold a workshop at the RAS Herbarium, located in the basement of the Rochester Museum and Science Center (RMSC). We will be continuing to organize plant specimens in preparation for digitizing the collection. If you plan to attend, please send an RSVP to rasherbarium@gmail.com. At RMSC go to the front desk to meet other participants. For more information, contact herbarium curators, Tim Tatakis

and Steven Daniel, by emailing rasherbarium@gmail.com.

April 9 Thurs: Life Sciences Special Event Lecture

7:00 p.m. The meeting will be held remotely via ZOOM and is open to all RAS Members and guests. Our featured speaker is Aurora Kuczek, a noted wildlife biologist who has traveled across the Americas working with birds in remote places like Alaska and Argentina. She will speak on *Seabird field research in remote environments*. Zoom details will be sent to all Life Sciences members and to any others who request it. For details, contact Michael Grenier at mgrenier@frontiernet.net.

Apr 11 Sat: Astronomy Messier Marathon

Contact Craig Kaplan at President@rochesterastronomy.org for details.

Apr 15 Wed: RAS Board Meeting

7:00 p.m. - 9:00 p.m. Pittsford Community Center, room 207, 35 Lincoln Ave, Pittsford. Zoom option available. For details, contact Michael Grenier at mgrenier@frontiernet.net.

Apr 22 Wed: Astronomy Forum

7:30 p.m. – 9:00 p.m. Zoom only. For details, contact Craig Kaplan at President@rochesterastronomy.org for details.

Apr 23 Thurs: Life Sciences Meeting

7:00 p.m. The meeting will be held remotely via ZOOM and is open to all RAS Members and guests. Our featured speakers are Dr. Paula Turkon, Associate Professor at Ithaca College

with students Grace Berlin, Hayley Russell, and Ellory Steinback. They will speak on *The Ithaca College Aquaponics Research Project*. Zoom details will be sent to all Life Sciences members before the meeting and to any others who request it. For details, contact Michael Grenier at mgrenier@frontiernet.net.

Apr 23 Thurs: Anthropology Meeting

6:30 p.m. Memorial Art Gallery, 500 University Avenue. Speaker: Robert Carr. Topic: 'Digging in Circles: Miami's Prehistoric Legacy'. He'll be discussing the prehistory of Florida. For more information, contact Alexander Smith at alexander_smith@alumni.brown.edu.

Apr 28 Tues: Mineral Section Meeting

7:30 p.m. Meet at the Pittsford Community Center. Room 207 (not the usual room). Zoom optional. "Gravity Analysis of Glacial Lake Genesee," presented by Dr. Scott Giorgis, of SUNY Genesee. Members will receive information in mid-April. Guests welcome. Contact: Jutta Dudley, juttasd@aol.com.

OUTSIDE RAS EVENTS:

Apr 9 Thurs: Loss Science Lecture

7:00 p.m. - 9:00 p.m. St. John Fisher University Cleary Family Auditorium. Annual Robert and Janice Loss Science Lecture with Dr. Andrew Knoll on how life on Earth couldn't have begun on an oxygen-rich planet, yet you couldn't live without it, and how Earth surface environments have changed markedly through time. Free and open to the public. Parking in Lot A.



Although an asteroid impact as the end-Cretaceous extinction agent had been previously proposed, sufficient evidence was not presented. That changed with the seminal 1980 paper *Extraterrestrial Cause for the Cretaceous-Tertiary Extinction* by Alvarez, Alvarez, Asaro, & Michel⁷. Every paper on the topic since 1980 should reference this paper. There are over 6,000 such citations. The impact cause of this extinction is one of the most researched topics in geology. Almost all the studies found or developed additional evidence supporting it, leading to near universal consensus.

That many space-originated objects have hit the earth with dramatic consequences is well-known. Researchers have hypothesized that 4.5 billion years ago a protoplanet the size of Mars struck the earth with the ejected debris forming the moon⁸. Some debris went into space, but evidence is that most of the impactor wound up in the Earth or the moon.

In the Late Heavy Bombardment, 4.1 to 3.8 billion years ago, over 1,000 impacts creating craters of diameter 200 km (120 miles) or more in diameter hit the Earth^{9,10,11}. More than half a billion years later, the Earth was hit in the South African Barberton greenstone belt by a 37 to 58 km wide meteor creating a crater estimated at 480 km in diameter¹². Two billion years ago the 160 km diameter Vredefort crater in Free State, South Africa was created¹³. 1.8 billion years ago the 130 km diameter Sudbury crater in Ontario, Canada was created¹⁴. All of this was before multicellular life could be

affected. More recently were the 100 km Manicouagan¹⁵ crater in Quebec, Canada dated to 216 million years ago and the 100 km Popigai¹⁶ crater in Siberia, Russia dated to only 36 MYA, each much smaller than Chicxulub, and neither of which caused a recognizable extinction.



Vredefort crater from gzadventures.com



Popigai crater, from www.thisistaimyr.org

Luis Alvarez was a brilliant physicist who won the 1968 Nobel prize for his discoveries. His son, Walter, was a geologist solving a timing problem.



Luis (left) and Walter Alvarez at a limestone outcropping near Gubbio, Italy, with a thin layer of clay in the K-Pg boundary where they found high concentrations of iridium. Credit: Lawrence Berkeley National Lab

They were not looking for iridium and found it accidentally. Scientists believed that there was a “gap” between Cretaceous rock and the subsequent Paleogene rock because sudden extinctions were not possible. They measured the cosmic dust amount in the K/Pg boundary, hoping to use the dust influx rate to determine the duration of the inferred “gap”. Scientists estimate that about 48.5 tons of meteoritic material falls on Earth each day,

mostly as dust. Instead, they found that the boundary sediments contained huge amounts of cosmic debris including iridium.

The Alvarez team wrote this in their abstract: “Deep-sea limestones exposed in Italy, Denmark, and New Zealand show iridium increases of about 30, 160, and 20 times, respectively, above the background level at precisely the time of the Cretaceous-Tertiary extinctions, 65 million years ago. Reasons are given to indicate that this iridium is of extraterrestrial origin.”

Next month—the Asteroid Impact—the first few minutes!

REFERENCES

7. Alvarez, L. W., Alvarez, W., Asaro, F., & Michel, H. V. (1980). Extraterrestrial cause for the Cretaceous-Tertiary extinction. *Science*, 208(4448), 1095-1108.
8. Hartmann, W. K., & Davis, D. R. (1975). Satellite-sized planetesimals and lunar origin. *Icarus*, 24(4), 504-515.
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15. Phinney, W. C., Dence, M. R., & Grieve, R. A. F. (1978). Investigation of the Manicouagan impact crater, Quebec: An introduction. *Journal of Geophysical Research: Solid Earth*, 83(B6), 2729-2735.
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Life Sciences Section

Special Life Sciences Lecture Event April 9, 7 p.m. on Zoom

Our guest speaker will be Aurora Kuczek, a noted wildlife biologist who has worked with birds across the Americas. She has traveled across the Americas working with birds in remote places like Alaska and Argentina. Please join us to hear her speak on **Seabird field research in remote environments.**

Do you think you could live like a puffin? Seabirds often breed in wet, cold, and rugged environments on remote islands and steep cliff sides all over the world. During non-breeding or immature periods, seabirds spend the rest of their lives in the open ocean. Overall, seabirds face harsh and dramatic climate changes. Being a seabird is unforgiving! This presentation will focus on the field work and seabird species that wildlife biologist, Aurora Kuczek, a Rochester native, has been working with since 2024. From the Pacific to the Atlantic, Aurora will discuss key

seabird species she has worked with, their life histories, and current research. She will also highlight local seabird-related conservation stories in New York.



This bird is a Black-browed Albatross (Thalassarche melanophris), identifiable by the dark line over its eye that resembles a black eyebrow. They are circumpolar in the southern oceans and are found across the Southern Ocean, nesting in huge colonies on remote islands like the Falklands. Photo by Aurora Kuczek.

Zoom details will be sent to all Life Sciences members and to any others who request it. For details, contact Michael Grenier at mgrenier@frontiernet.net.

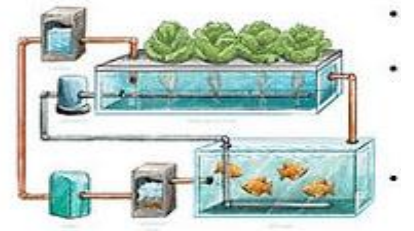
The next meeting of the Life Sciences Section will be on Thursday, April 23 at 7:00 p.m.

Our speakers are Dr. Paula Turkon, Associate Professor at Ithaca College with students Grace Berlin, Hayley Russell, and Ellory Steinback. They will speak on the Ithaca College aquaponics research project. Grace Berlin and Hayley Russell presented at the 2025 RAS Scientific Paper Session on their research on "The Effectiveness of Three Fish Species on Plant Growth in an Aquaponic System."

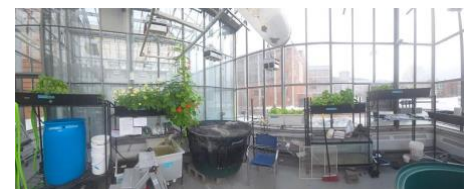
Zoom details will be sent to all Life Sciences members before the meeting and to any others who request it.

What is Aquaponics?

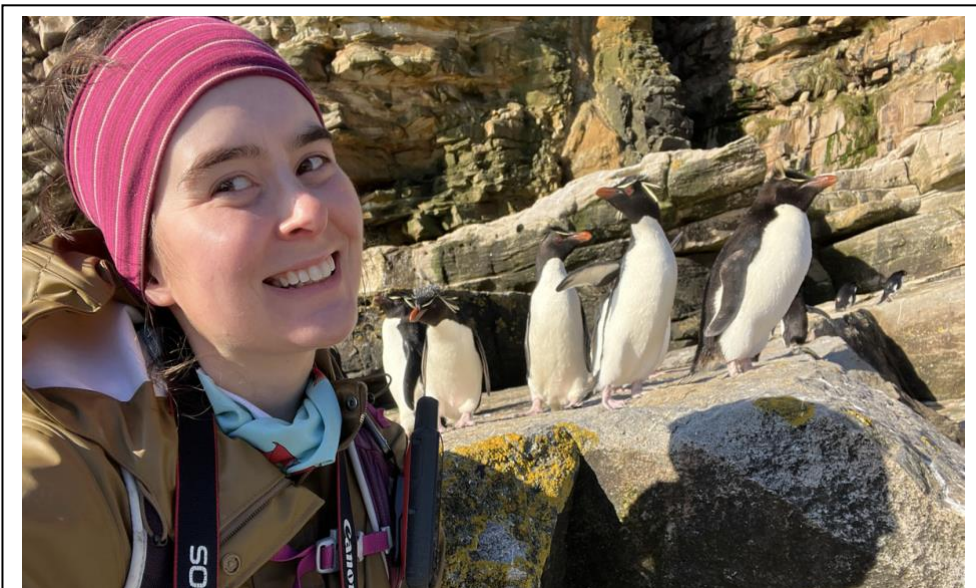
(from a poster by Grace Berlin, Hayley Russell, Esther Hong, and Jake Raynsford)



It is a symbiotic relationship between fish and plants. Fish are raised in a system where their waste is converted into nutrients for plant growth. Nutrient rich water is circulated through the entire system for plant use.



Aquaponics Lab at Ithaca College.



Speaker Aurora Kuczek with a group of Rockhopper penguins (*Eudyptes chrysocome*). The southern rockhopper breeds on the Falkland Islands, Argentina and Chile, as well as South Africa and several Indian Ocean islands.

Undergraduate Student Research Grant Awards



Ella Mahnke: First place and winner of the RAS Dr. William L. Hallahan Award for Excellence in Grant Proposal Writing.

Ella Mahnke, EEG Markers of Audiovisual Integration Impairments in Asymptomatic Individuals with a Concussion History, Rochester Institute of Technology, Sponsor/Advisor: Elena Fedorovskaya.

Abstract

Annually, around 1.6 to 3.8 million Americans are impacted by sports-related concussions, while many experience persistent cognitive difficulties despite clinical symptom resolution. Current return-to-play and return-to-learn protocols rely almost entirely on self-reported symptoms, failing to detect subtle deficits that may hinder academic performance. These protocols primarily focus on memory, attention, and motor functioning, but fail to assess a critical component necessary for academic success, multisensory integration. Multisensory integration is the brain's ability to combine information from multiple sensory modalities, and it is essential for classroom learning, where students must simultaneously process speech and visual information. Although behavioral research has demonstrated that concussions affect multisensory integration and may extend the temporal binding window, the neural mechanisms underlying audiovisual integration deficits remain uncharacterized in this population. This study will use EEG to identify electrophysiological markers of impaired audiovisual integration, specifically N1 suppression and P2 modulation, in clinically asymptomatic college students. Participants will complete an audiovisual detection task with degraded stimuli in the auditory-only (A), visual-only (V), and audiovisual (AV) conditions while a continuous EEG is recorded. Stimuli are presented at reduced intensity to stress the multisensory system, increasing sensitivity to subtle deficits. Mediation analyses will test whether neural integration efficiency accounts for group differences in behavioral reaction-time facilitation. We expect that N1/P2 suppression will be established as a sensitive biomarker for persistent multisensory integration dysfunction, challenging the current clinical definitions of recovery. These findings could inform more sensitive clinical assessments and support evidence-based academic accommodations for students recovering from concussion.



Liam Brown: RAS Undergraduate Student Grant Winner 2025-2026.

Liam Brown: Validation of a CRISPR-Engineered Fluorescent CD63-Tagged MSC Line for Extracellular Vesicle Tracking.

Rochester Institute of Technology. Advisor: Karin Wuertz-Kozak, R.I.T. Department of Biomedical Engineering, Kate Gleason College of Engineering,

Abstract

Extracellular vesicles (EVs) are small particles released by cells that play an important role in cell-to-cell communication and have shown significant therapeutic potential. Mesenchymal stem cell-derived EVs (MSC-EVs) in particular have been studied for their anti-inflammatory and regenerative effects. However, studying EVs remains challenging due to their small size and the difficulty of clearly identifying and characterizing different EV populations. One strategy pursued in the sponsoring laboratory to address this challenge is the fluorescent tagging of EV-associated membrane proteins, enabling direct visualization and tracking of EVs. Specifically, ongoing work seeks to tag the EV marker CD63 in MSCs using a CRISPR-based fast homology-directed repair (fast-HDR) approach to generate a fluorescently labeled MSC line. Because genetic modification could potentially alter cell behavior, this study will validate whether CD63 tagging affects MSC or EV function. First, the multipotent capacity of tagged MSCs will be assessed using trilineage differentiation and compared to unmodified control cells. Next, EVs isolated from tagged and control MSCs will be tested for bioactivity using an in vitro macrophage inflammation model, where changes in pro-inflammatory marker expression will be measured. The central hypothesis is that fluorescent tagging of CD63 can be achieved without altering MSC multipotency or the anti-inflammatory properties of MSC-derived EVs. Successful completion of this project will validate fluorescent CD63 tagging as a useful tool for EV identification and tracking, supporting future studies aimed at improving EV characterization and therapeutic applications.

Bylaws Changes to Be Voted at 2026 Annual Meeting

Your ballot in this issue for voting for officers also includes voting for three Bylaws changes announced last year. These are important to bring us into compliance with NY State law. They allow us to do much of what we currently are doing since COVID. PLEASE help the RAS by voting for these. The ballot may be found on the next page.

The Bylaws and Constitution of the Academy can be found on our web site at <https://rasny.org/about-us>. These proposed changes were read to the attendees at the Annual Meeting on April 22, 2025, as required by our Bylaws.

First, the opening line of Chapter 10, section 1 on notifications needs to be changed, particularly to allow us to use email for notifications.

Second, a new section needs to be added to Chapter 10 to allow us to hold electronic meetings by Zoom or other such means.

Third, our Bylaws have nothing about meeting quorums. NYS Law requires quorums. We propose to add the following new section to Chapter 10. This is taken directly from New York State Law, with some editing.

Please vote for these. Thank you.

Michael Grenier

RAS Member Images



Rosette Nebula. Don Kubisa; March 9, 2026 using H-alpha, OIII, SII (SHO system).

ROCHESTER ACADEMY OF SCIENCE
BALLOT FOR JUNE 2026 – MAY 2027 OFFICERS

Mail your completed ballot to RAS, P.O. Box 92642, Rochester NY 14692-0642.

OFFICE	NAME	√	Write-In Candidate
President:	Michael Grenier		
Vice President:	Jeff Gutterman, P.E.		
Treasurer:	Tim Tatakis, Ph.D.		
Secretary:	Helen Downs Haller, Ph.D.		
Member, Board of Directors (2026-2029)	Karen Wolf		
Member, Board of Directors (2026-2029)	Douglas Kostyk		

BALLOT TO VOTE FOR OR AGAINST PROPOSED BYLAWS CHANGES

<p>Shall the proposed Bylaws change to Chapter 10 Section 1 correcting the notification period be made? Under CHAPTER X. Meetings. The first section will be changed by deleting the phrase “38 but not more than 08 days prior to the date thereof,” and replacing it with "ten days but not more than fifty days before the date of the meeting." Further, a statement has been added noting that delivery is to be "by First Class mail or by electronic mail" such that the paragraph reads: “1. At least ten days but not more than fifty days before the date of the meeting, a notice shall be sent to every Active Member by First Class mail or by electronic mail stating the time and place at which a regular meeting is to be held. If mailed by any other class of mail, it shall be given not less than thirty nor more than sixty days before such date. The Annual Meeting shall be held at the first public meeting of the Academy each calendar year.” <i>The notification period is taken directly from New York State Law, with some editing.</i></p>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<p>Shall the proposed Bylaws addition to Chapter 10 allowing us to hold electronic meetings by Zoom or other such means be made as new Section 4? <i>The following new section will be added. This is taken directly from New York State Law, with some editing.</i> 4. Any meeting of members may be held partially or solely by means of electronic communication and the electronic service and/or platform by which the meeting is held shall be the place of the meeting if a meeting is held solely by means of electronic communication. Meeting leaders will verify that each person participating electronically is a member or a proxy of a member. Each member participating electronically will be given reasonable opportunity to participate in the meeting, including an opportunity to propose, object to, and vote upon a specific action to be taken by the members, and to see, read or hear the proceedings of the meeting substantially concurrently with those proceedings. Meeting leaders will record and maintain a record of any votes or other actions taken by electronic communication at the meeting.</p>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<p>Shall the proposed Bylaws addition to Chapter 10 setting meeting quorums as required by NYS Law be made as new Section 5? <i>The following new section will be added. This is taken directly from New York State Law, with some editing.</i> 5. A Quorum at any meeting of members will be the lesser of either the number of members entitled to cast a) one hundred votes (including proxies) or b) the votes of one-tenth of the total number of members. <i>(This means that if we have over 1000 members then 100 members have to be represented in person or by proxy, but since we have only 270 members as of 3/31/2025, only 27 members have to be represented in person or by proxy, since that is 10% of the total.)</i></p>	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Rochester Research in Review.

(These are Hot Links which when clicked lead to the press release on the Science Daily and other science websites.)

[This tiny implant, smaller than a grain of salt, can read your brain. Cornell University; March 24, 2026.](#)

[Project Hail Mary meets reality: 45 planets could harbor alien life. Cornell University leadership; March 25, 2026.](#)

[Scientists finally see the atomic flaws hiding inside computer chips. Cornell University; March 5, 2026.](#)

[How animals make group decisions—without a leader. University of Rochester; March 6, 2026](#)

[Researchers discover luminous signature to identify supermassive black hole mergers. Rochester Institute of Technology; March 24, 2026.](#)



Lunar Eclipse. Doug Kostyk; March 3, 2026.

ABOUT THE ACADEMY

The Rochester Academy of Science™, Inc. is an organization that has been promoting interest in the natural sciences since 1881, with special focus on the western New York state region. Membership is open to anyone with an interest in science. Dues are minimal for the Academy and are listed in the [membership application online](#). Each Section also sets dues to cover Section-related publications and mailings. We are recognized as a 501(c)3 organization.

For information, contact President Michael Grenier at (585) 671-8738 or by email paleo@frontier.com.

The Academy Internet website is <http://www.rasny.org> or see us on Facebook at <https://www.facebook.com/Rochester-Academy-of-Science-792700687474549>.

This “BULLETIN” is produced monthly, except January and August, by the Rochester Academy of Science™. Submissions are due by the 10th of the previous month and may be emailed to the Bulletin Editor Robert Crumrine at bob.crumrine@gmail.com.

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